



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE

United States Patent and Trademark Office

Address: COMMISSIONER FOR PATENTS

P.O. Box 1450

Alexandria, Virginia 22313-1450

www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/517,875	12/13/2004	Lucas Sannier	28944/40139	1336
29471 7590 09/11/2008 MCCRACKEN & FRANK LLP 311 S. WACKER DRIVE SUITE 2500 CHICAGO, IL 60606				
EXAMINER				
SEDDIQUEE, MUHAMMAD S				
ART UNIT		PAPER NUMBER		
1795				
MAIL DATE		DELIVERY MODE		
09/11/2008		PAPER		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/517,875

**Applicant(s)**

SANNIER ET AL.

**Examiner**

MUHAMMAD SIDDIQUEE

**Art Unit**

1795

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 13 December 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 26-51 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 26-51 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 December 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-8508)
- Paper No(s)/Mail Date 3/8/2005, 4/15/2005
- 4) ☐ Interview Summary (PTO-413)
- Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

**DETAILED ACTION**

***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

2. Claims 26-30, 32, 37, 39-40, 47-49 are rejected under 35 U.S.C. 102(a) as being anticipated by Yun et al (WO 02/061872 A1).

Regarding claim 26, Yun discloses a lithium secondary battery comprising a cathode (positive electrode); an anode (negative electrode); an organic electrolyte solution in which a lithium salt is dissolved in an organic solvent (liquid electrolyte comprising a lithium salt); multi-layered polymer electrolyte comprising a separator film layer formed of a polymer electrolyte (plasticized separator), PP, PE, PVdF or a non-woven fabric; a gelled polymer electrolyte layer (gelled separator) which is cast onto one or both surfaces of the separator film layer, comprising a) 5 -90 wt % of PAN group polymer; b) 5 -80 wt % of polymer selected from the group consisting of PVdF [ Fig. 1-2; page 8, lines 15-24, page 9, lines 1-5, page 12, lines 5-21]. The figures show that the gelled separator is in contact with the negative electrode and the plasticized separator is in contact with the layer of gelled separator.

Regarding claim 27, Yun teaches that the plasticized separator layer is in contact with the positive electrode [Fig. 2a].

Regarding claim 28, Yun teaches that the battery comprises, in addition, another gelled separator layer, between the positive electrode and the plasticized separator layer [Fig. 2a].

Regarding claim 29, Yun teaches that the plasticized separator comprises polyvinylidene fluorides (PVDFs) [page 8, lines 19-20].

Regarding claim 30, Yun teaches that the gelled separator polymer is selected from the group consisting of polymethyl methacrylate (PMMA), and polyacrylonitrile (PAN) [page 8, lines 20-24, page 9, line 1].

Regarding claim 32, Yun discloses a process for manufacturing a lithium secondary battery comprising a cathode (positive electrode); an anode (negative electrode); an organic electrolyte solution in which a lithium salt is dissolved in an organic solvent (liquid electrolyte comprising a lithium salt); multi-layered polymer electrolyte comprising a separator film layer formed of a polymer electrolyte (plasticized separator); a gelled polymer electrolyte layer (gelled separator) which is cast onto one or both surfaces of the separator film layer, and the combination of these two or three layers constituting a separator between the negative electrode and the positive electrode, an assembly of the separator on the positive electrode, and an impregnation of said separator by the liquid electrolyte [Fig. 1-2; page 8, lines 15-24, page 9, lines 1-5, page 11, lines 7-21, page 12, lines 5-21; examples 1-8].

Regarding claim 37, Yun teaches that the gelled polymer electrolyte layer (gelled separator) is manufactured in solution from polymer GP, solvent and optionally plasticizer [page 11, lines 7-21].

Regarding claim 39-40, Yun teaches that the polymer electrolyte is generally filled with at least one mineral compound selected from the group consisting of MgO, SiO<sub>2</sub>, Al<sub>2</sub>O<sub>3</sub>, TiO<sub>2</sub>, BaTiO<sub>3</sub>, LiI and LiAlO<sub>2</sub> [page 11, lines 2-6].

Regarding claim 47, Yun teaches that propylene carbonate can be used as a plasticizer [page 10, lines 20-24].

Regarding claim 48 Yun teaches that the plasticized separator comprises polyvinylidene fluorides (PVDFs) [page 8, lines 19-20].

Regarding claim 49, Yun teaches that the gelled separator polymer comprises polyacrylonitrile (PAN) [page 8, lines 20-24, page 9, line 1].

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).
6. Claims 31 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yun et al (WO 02/061872 A1) as applied to claim 26 above, and further in view of Yun et al (US 6,355,380 B1).

Regarding claim 31, Yun teaches that and cathode used in lithium secondary batteries are fabricated conventional art by mixing a certain amount of active materials, conducting materials, binders and an organic solvent [page 14, lines 14-22]. Yun remains silent about the specific conducting material. However, Yun '380 discloses a lithium battery comprising a cathode wherein the cathode comprises an active material, graphite as a conductive material [column 7, lines 16-26]. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use graphite (carbon) as taught by Yun '380 in order to have an efficient cathode.

Regarding claim 33, Yun teaches that and cathode used in lithium secondary batteries are fabricated conventional art by mixing a certain amount of active materials, conducting materials, binders and an organic solvent [page 14, lines 14-22]. *This is*

*manufactured in solution form since a solvent is used.* Yun remains silent about the specific conducting material. However, Yun '380 discloses a lithium battery comprising a cathode wherein the cathode comprises an active material, graphite as a conductive material [column 7, lines 16-26]. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use graphite (carbon) as taught by Yun '380 in order to have an efficient cathode.

7. Claims 34, 36 and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yun et al (WO 02/061872 A1) as applied to claim 32 above, and further in view of Doyle (WO 00/51806).

Regarding claims 34, 36 and 38, Yun teaches that Electrolyte separator layers are manufactured from polymer, plasticizer and liquid electrolyte. Yun remains silent about manufacturing the separator by extrusion. However, Doyle discloses a process for forming multilayer articles such as separators and electrodes by extrusion [page 17, lines 2-39; examples 1-10]. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use extrusion process for making separators, electrodes and battery as taught by Yun '380 in order to have an efficient cathode.

8. Claim 35 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yun et al (WO 02/061872 A1) as applied to claim 32 above.

Regarding claim 35, Yun remains silent about the process of making the separator film. However, Yun teaches that the gelled polymer electrolyte layer (gelled separator) is manufactured in solution from polymer, solvent and optionally plasticizer

[page 11, lines 7-21]. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a similar method of making the separator in solution from polymer, solvent and plasticizer in order to have an efficient and convenient process.

9. Claims 41 and 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yun et al (WO 02/061872 A1) as applied to claim 32 above, and further in view of Travas-Sejdic et al (US 2002/0136952 A1).

Regarding claims 41 and 44, Yun teaches that electrolyte layers and anode and cathode layers are joined together by lamination process. However, Travas-Sejdic discloses a battery comprising anode, cathode and separator wherein these elements are joined together by heat lamination to form a strong, permanent bond. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use heat lamination as taught by Travas-Sejdic in order to form a strong, permanent bond.

10. Claims 42 and 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yun et al (WO 02/061872 A1) as applied to claim 32 above, and further in view of Dasgupta et al (US 2002/0031706 A1).

Regarding claims 42 and 43, Yun remains silent about manufacturing the separators by dipping process. However, depositing or coating separators by dipping into the solution is well known in the art. Dasgupta discloses a lithium battery comprising a separator wherein the separator is made by dipping process [paragraph 0035]. Therefore, it would have been obvious to one of ordinary skill in the art at the



time the invention was made to use dipping process as taught by Dasgupta in order to have an efficient and cost effective method of forming a thin layer.

11. Claims 45 and 46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yun et al (WO 02/061872 A1) as applied to claim 32 above, and further in view of Ma et al (US 6,44,356 B1).

Regarding claims 45 and 46, Yun remains silent about removing plasticizer from the battery. However, Ma discloses a secondary battery manufacturing steps comprising removing of plasticizer under vacuum to create micro-porous layer conductive to lithium ions and then laminating the electrodes and separator. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to remove plasticizer using vacuum as taught by Ma in order to create micro-porous layer conductive to lithium ions and thereby an efficient battery.

12. Claims 50 and 51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yun et al (WO 02/061872 A1) as applied to claim 26 and claim 32 above, and further in view of Enomoto et al (US 2001/0049054 A1).

Regarding claims 50 and 51, Yun remains silent about usage of the battery. However, Enomoto teaches that lithium secondary battery can be used for hybrid vehicle [paragraph 0002]. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the battery of Yun in hybrid vehicle as taught by Enomoto in order to save energy and protect the environment.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MUHAMMAD SIDDIQUEE whose telephone number is (571) 270-3719. The examiner can normally be reached on Monday-Thursday, 7:30 am to 4:00 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

MSS

/PATRICK RYAN/  
Supervisory Patent Examiner, Art Unit 1795